

# Assessing the association between low back pain, quality of life, and life events as reported by schoolchildren in a population-based study

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**Abstract** Low back pain (LBP) is prevalent in teenagers but not necessarily detrimental to their quality of life (QoL). This population-based study evaluated a global QoL score and the association between LBP and life events and/or health problems affecting QoL. Schoolchildren were investigated in Fribourg-Switzerland and Barcelona-Spain. In addition to the KIDSCREEN, a health-related QoL questionnaire, two Numerical Rating Scales were used to assess QoL in general, and the influence of LBP on QoL. Open questions explored life events and health problems affecting QoL; responses were submitted to content analysis. Adolescents were stratified: Pain-free, Other pain (OP), isolated LBP (IsoLBP), LBP + other pains (LBP + OP), and LBP + whole-body pain (LBP + WBP). Between-group comparisons were performed using Chi-squared tests and ANOVA. Linear regression analysis

was performed to assess between-group differences in the impact of LBP on QoL. Schoolchildren (1,470) (mean age = 15.05 years, 52.6% = boys) completed the questionnaire. LBP lasting >1 day in the last month was reported by 39.8% ( $N = 560$ ): of them, 242 (43.2%) reported IsoLBP, 268 (47.9%) LBP + OP, and 50 (9.1%) LBP + WBP. QoL was lower in LBP + WBP (mean = 6.44 vs. LBP + OP = 7.8; IsoLBP = 7.6, OP = 7.96, Pain-free = 8.1;  $p < 0.001$ ). There were 18.5% who reported health problems and 15.3% life events with a perceived impact on QoL. Prevalence was higher in LBP + WBP with >30% of this group identifying life events and/or health problems vs. 10–12% in PFree or IsoLBP groups ( $p < 0.001$ ). IsoLBP affected QoL marginally (mean =  $2.4 \pm 2.2$ ) compared to LBP + WBP (mean =  $4.9 \pm 2.4$ ) ( $p < 0.001$ ). LBP affected QoL marginally. These results stress the distinction

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between disease and common life experience. They also indicate the potential value of global QoL assessments in clinical settings.

**Keywords** Low back pain · Quality of life · Adolescents · Brief scales · Life events

## Introduction

The vision that the scientific community has of children and adolescents' low back pain (LBP) has deeply changed during the last decades. It has moved from that of an uncommon and frequently serious problem to an almost normal life experience for a majority of teenagers. Recent studies have also shown that in children free of LBP, adverse psychosocial factors and other somatic pain symptoms are predictive of future LBP [8]. Hence, the focus of the research that was initially oriented towards the identification of relevant clinical or biomedical variables or predictors, has progressively switched towards more subject-centered variables like health-related quality of life (QoL).

This study is inserted within the framework of a research project exploring LBP and QoL in teenagers. The primary aim of this project was to investigate the prevalence of low back pain and its impact on health-related QoL in adolescents. In this context, we examined schoolchildren in a cross-sectional population-based study, using a generic health-related QoL and two LBP-specific instruments. The results showed that schoolchildren self-reporting LBP suffered no significant reduction in QoL. However, a small subgroup of adolescents reporting LBP and generalized pain (about 5%) showed a significantly decreased health-related QoL [19].

The available generic tools to evaluate adolescents' health-related QoL have been reviewed recently. A majority of these tools are multidimensional and include a variable number of items, ranging from 16 to 188 [22]. For adults, a trend has emerged to reduce the burden of administration for self-reported tools with the development of shortened versions or of brief multidimensional tools like the Core Outcome Measures Index for LBP [5,11]. The validity of a single question on LBP bothersomeness has been documented [3], and short forms have been reported to have acceptable psychometric properties in children as well [16].

The present study aimed to investigate a global self-reported QoL score in the evaluation of the impact of LBP, using Numerical Rating Scales to assess self-reported QoL and the schoolchildren's perception of the impact of LBP in addition to the generic instrument (KIDSCREEN). It also looked into the association between self-reported health problems (other than LBP), life events perceived as

affecting QoL, and LBP in otherwise healthy schoolchildren. Indeed, prospective cohort studies have stressed the relationship between adverse events in childhood and chronic widespread pain [9].

Because of the aims of the study, we used the same subgroups as those identified in the prevalence study depending on the absence or presence of pain in the lower back and/or in other body areas [19]. For this study, we hypothesized that a global score allows for an overall assessment of QoL in schoolchildren and that this assessment may be affected by co-morbidities in general and by LBP in particular but also by life events unrelated to health.

## Methods

The methodology of this cross-sectional study, investigating representative samples of schoolchildren in Fribourg-Switzerland and in Barcelona-Spain, has been detailed elsewhere [19]. Briefly, the adolescents attending third course of all secondary schools were involved in Fribourg. In Barcelona, a representative sample of adolescents from public and private schools (first to fourth years) was selected using two-stage cluster sampling: the schools were stratified by type of school (public or private) and by the family economic capacity index (high, medium, and low) [1,28]. All adolescents in each classroom selected were included. Sample size was calculated as 900 adolescents, assuming a 15% prevalence of LBP and a response rate of 75%, with an  $\alpha$  risk of 5% and a statistical power of 80%.

The protocol was approved by the Ethics Committee of Vall d'Hebron Hospital and by Fribourg school authorities. A letter was sent to the parents or guardians of adolescents a few days before questionnaires were administered in each school. All adolescents self-completed the questionnaire during class time. The questionnaires were available in Spanish and Catalan, the official languages in Barcelona, and in French, the official language in Fribourg.

The questionnaire included socio-demographic variables, questions about LBP experience and pain in other body areas, and data on chronic illnesses. Adolescents with LBP were identified by means of a question inquiring about pain in the lumbar area, shown on a preshaded manikin, as used in related epidemiological studies [29]. Adolescents reporting pain in the shaded area lasting 1 day or longer during the preceding month were classified as having LBP. Pain intensity (defined as the worst pain during the past month) was measured using a Numerical Rating Scale (NRS) from 0 (none) to 10 (maximum). The questionnaire also evaluated the prevalence of pain in other body areas (head; shoulder-arm; neck; knee-leg; upper back; stomach; other (please specify); or none) during the preceding month and identified adolescents who endorsed an item investigating

whether they experienced “pain all over their body” (whole-body pain). According to reported pain, adolescents were classified into five groups: Pain-free (PFree); other pain (OP), which included all adolescents with no LBP during the last month but reporting other pains during that period; isolated LBP (IsoLBP); LBP plus other pains (LBP + OP); and LBP plus whole-body pain (LBP + WBP) which included all adolescents reporting LBP, other pain, and considering themselves to have whole-body pain [19].

Two LBP-specific instruments were included, i.e., the Roland-Morris Disability Questionnaire (RMDQ) and the Hanover Functional Ability Questionnaire (HFAQ). Both the RMDQ and the HFAQ are measures of functional outcome in LBP, and data are available for adolescent populations [4,29]. The Roland-Morris Questionnaire is one of the most widely used validated instruments for measuring functional outcome in LBP. The questionnaire has 24 items related to physical function. Each item checked receives a score of 1, and scores range from 0 (no disability caused by LBP) to 24 (maximum possible disability from LBP); based on previous studies, a cutoff point of 6 was used to identify adolescents with moderate to severe disability [4,27]. The adapted Hanover Functional Ability Questionnaire [29] inquires about activity limitation and was used as another measure of disability. It includes ten activities with yes/no answers, and the score ranges from 0 (no disability) to 10, with a cutoff point of 5 to classify adolescents as experiencing moderate to severe disability.

As for QoL, a generic instrument, the KIDSCREEN questionnaire, specifically designed to measure health-related QoL in children and adolescents [24] was also included. In the present analysis, we included the KIDSCREEN-10 summary score, the shorter version of the KIDSCREEN, which contains ten items which cover all dimensions of the longer version of the instrument. Each item is answered on a 5-point scale with response options ranging from “never” to “always” or from “not at all” to “extremely”. Items 1 and 2 explore physical activity, energy, and fitness. Items 3 and 4 cover depressive moods, emotions, and stressful feelings. Items 5 and 6 investigate participation in social activities. Item 7 covers relationships within the family. Item 8 examines relationships with peers. Finally, items 9 and 10 explore the child's/adolescent's perception of his/her cognitive capacity and satisfaction with school performance. Responses were coded so that higher values indicate better well-being; they were then summed and the sum score transformed to Rasch person parameters (PP). The PPs were linearly transformed into a scale ranging from 0 to 10. A low score indicates a poor health-related QoL, and a high score is indicative of a better health-related QoL [23].

In addition to the KIDSCREEN, two different NRS were included to assess (a) QoL in general (from 0=extremely poor to 10=excellent); and (b) the extent to which LBP affects QoL (from 0=no influence to 10=highest possible influence). The presence and type of health problems (other than LBP) as well as the presence and type of life events (other than health-related) affecting QoL were recorded by means of open questions. We chose to ask the adolescents to respond to open-ended questions instead of relying on multiple-choice questionnaires. The issue in this study was not to evaluate the prevalence of various predefined health problems and life events as might be proposed in a structured questionnaire; it was rather to investigate the adolescents' appraisal of their QoL and their own perception of which health problems and life events may affect their QoL.

Differences between groups in the categories drawn from content analysis of the questions addressing the adolescents' report of any health problems and life events they experience and consider that may affect their QoL were tested with Chi-squared test. As for the NRS, mean differences between groups were tested by one-way analysis of variance. We used the Tukey-studentized range test for post-hoc comparisons among group means. A figure was constructed to show the mean and 95% confidence interval of the NRS QoL, KIDSCREEN-10, and NRS of LBP impact according to groups defined by reported pain. Finally, two multivariate linear regression models, with NRS QoL and KIDSCREEN-10 as dependent variables, were constructed to assess differences in quality of life impact between groups defined by reported pain, after adjusting by other relevant variables (socio-demographic characteristics, impact of LBP, health problems, and life events). As for socio-demographic variables, age groups and sex were included because they were related to the QoL as measured by the KIDSCREEN in our first study [19] with boys and older teenagers reporting lower scores.

As for the open-ended questions, the format of the responses (free responses on a blank sheet) allowed the collection of data that could be submitted to content analysis [12,21,26]. Two researchers, a rheumatologist and a psychologist, performed this analysis. Firstly, broad categories encompassing health problems (other than LBP) and life events (other than health-related) affecting QoL were identified using a manual data indexing technique to identify key themes [26]. Secondly, these categories were discussed and refined by consensus between the two researchers. Thirdly, the researchers independently classified the children's answers into those categories. Inter-rater agreement was high (kappa coefficient >0.92), disagreements were solved by consensus. These variables were dichotomized (present/absent) for inclusion in the multivariate linear regression analysis.

## Results

The total number of adolescents was 1,726 (1,126 from Barcelona-Spain, and 600 from Fribourg-Switzerland). On the day of the study, 256 adolescents were absent from school or refused to complete the questionnaire. As school absence is subjected to rules of confidentiality, no information was available on the reasons of absence. Ultimately, 1,470 adolescents (mean age=15.05 years (SD=1.14), 52.6%=boys) completed the questionnaire (response rate, 85.1%), 1,406 (95.6%) of whom were available for the present analysis. LBP lasting >1 day in the last month was reported by 39.8% of the responders ( $N=560$ ): of these, 242 (43.2%) reported IsoLBP, 268 (47.9%) LBP + OP and 50 (9.1%) LBP + WBP. Overall, LBP prevalence and prevalence of the LBP subgroups (IsoLBP, LBP + OP, and LBP + WBP) showed no differences between the Fribourg and Barcelona samples (Table 1). Comparisons between the samples showed the expected differences in age and no difference in the gender distribution.

Briefly, data from the two representative samples had shown that IsoLBP seemed to be milder and to last a shorter time [19]. The results showed that the majority of this group (58%) experienced pain lasting “only a few minutes” while LBP + OP reported both pain lasting “a few minutes” (40%) and pain that is “not constant, comes and goes” (48%,  $p<0.001$ ), and LBP + WBP pain that “comes and goes” (48%) and “constant pain” (32%,  $p<0.001$ ). As for pain intensity, IsoLBP reported significantly lower levels of pain than both the LBP + OP (4.24 (SD=2.22) vs. 5.12 (2.26),  $p<0.001$ ) and the LBP + WBP (6.84 (2.24),  $p<0.001$ ) groups.

The global appraisal of QoL as measured on a NRS was significantly lower in the group of LBP + WBP (mean=6.44, SD=2.47) as compared to the means of the other groups (LBP + OP=7.8 (SD=1.75); IsoLBP=7.6 (SD=

1.83), OP=7.96 (SD=1.39), and PFree=8.1 (SD=1.58);  $p<0.001$ ) (Table 2). These results parallel those evidenced by means of the KIDSCREEN-10 index with hardly any impact of LBP or of other pain on QoL, except for LBP + WBP (Fig. 1).

The analysis of the responses to the question investigating the presence and type of health problems (other than LBP) with a perceived impact on their QoL allowed sorting health problems into five main categories: allergy/respiratory problems; musculoskeletal disorders; headaches and migraines; ear, nose and throat problems; and abdominal/stomach symptoms.

As for life events with a perceived impact on QoL, six categories were derived from content analysis: school problems (e.g., related to the exams, to the marks, to the teachers, to learning disabilities); family issues (e.g., illness or death of a parent, conflicts within the family); psychological problems (e.g., anxiety, depression, loneliness, lack of self-esteem) which in some instances referred more specifically to the body image (e.g., height, weight, acne); lack of spare time; financial difficulties (personal or within the family); and relational problems (with the peers).

For the whole sample, 18.5% ( $N=260$ ) reported health problems (other than LBP) and 15.3% ( $N=215$ ) life events with a perceived impact on their quality of life. For both questions, self-report was significantly higher ( $p<0.001$  and  $p<0.01$ , respectively) in the LBP + WBP group with more than 30% of the members of this group mentioning health problems and/or life events affecting their QoL versus only about 10% in the PFree or in the IsoLBP groups (Table 3). The report of health problems was also close to 30% in the group including the adolescents reporting LBP and other pain but who did not consider themselves to have whole-body pain (LBP + OP). In both groups (i.e., LBP + OP and LBP + WBP) about 8% mentioned allergy/respiratory problems. Only headaches

**Table 1** Characteristics of the samples

	All individuals	Fribourg, Switzerland	Barcelona, Spain
Gender, $N$ (%)			
Female	697 (47.4)	264 (46.6)	433 (48.0)
Male	773 (52.6)	303 (53.4)	470 (52.0)
Age, mean (SD), years <sup>a</sup>	15.07 (1.14)	15.75 (0.58)	14.63 (1.19)
Range of ages, years	12–17	14–17	12–17
Pain group, $N$ (%)			
LBP total	587 (39.8)	212 (37.4)	375 (41.3)
IsoLBP <sup>a</sup>	250 (17.4)	77 (13.9)	173 (19.5)
LBP + OP	271 (18.8)	109 (19.7)	162 (18.2)
LBP + WBP	50 (3.5)	18 (3.3)	32 (3.6)
Pain free	500 (34.7)	197 (35.7)	303 (34.1)
Other pain	369 (25.6)	151 (27.4)	218 (24.5)

LBP low back pain, IsoLBP isolated low back pain, LBP + OP low back pain plus other pain, LBP + WBP low back pain plus whole-body pain

<sup>a</sup>Chi-squared test or  $t$  test of differences between samples from Fribourg ( $N=567$ ) and Barcelona ( $N=903$ ),  $p<0.05$

**Table 2** ANOVA of the mean values of the Numerical Rating Scale assessing Quality of Life among the five subgroups created according to self-reported low back pain

	N	Mean	Std. Deviation	95% Confidence interval for mean		Min	Max
				Lower bound	Upper bound		
Pain free	481	8.07	1.58	7.93	8.21	0	10
OPain	365	7.96	1.39	7.82	8.11	2	10
IsoLBP	242	7.62	1.83	7.39	7.86	0	10
LBP + OP	268	7.82	1.75	7.61	8.03	0	10
LBP + WBP	50	6.44	2.47	5.74	7.14	0	10
Total	1,406	7.86	1.68	7.77	7.95	0	10

Between-group differences:  $F=12.9$  (4);  $p<0.001$

*Pain free* no pain during the previous month, *OPain* no pain in the lumbar area during the last month but reporting other pains during that period, *Iso LBP* pain limited to the lumbar area, *LBP + OP* pain in the lumbar area and at least in one other part of the body, *LBP + WBP* pain in the lumbar area and whole-body pain

(4.1% versus 2%) and ear, nose and throat problems (1.5% versus 0%) were significantly more often mentioned in the LBP + OP subgroup than in the LBP + WBP one. On the opposite, other musculoskeletal problems (16% versus 6.6%) and abdominal/stomach symptoms (4% versus 1.8%) were more often evoked in the LBP + WBP subgroup.

The categorization of health problems showed that overall the most frequent complaints were allergy/respiratory and musculoskeletal disorders. As for life events, school problems and family issues were in the foreground. Both could be either general (“Exams are stressful”; “I’ve family problems”) or more specific (“I don’t like school, I’m dyslexic, I’ll never do it”; “my mother has a cancer”). Mention of psychological problems was noticeably higher in the WBP + LBP subgroup (12% versus  $\leq 3\%$  in all other subgroups;  $p=0.003$ ).

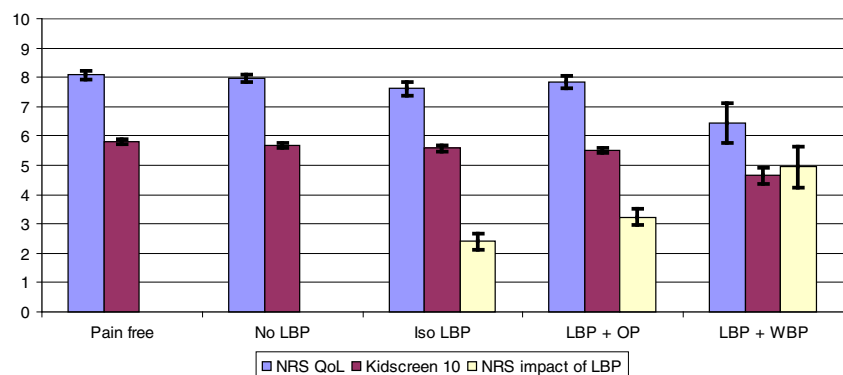
Regarding the extent to which LBP affects the adolescents’ quality of life, the impact of isolated LBP as measured on an 11-point NRS was only marginal (mean=2.4, SD=2.2), whereas LBP had a larger impact when

associated with whole-body pain (mean=4.9, SD=2.4) ( $p<0.001$ ) (Fig. 1).

The reported global QoL showed a significant negative correlation with both the RMDQ and HFAQ scores, but only in the LBP + WBP group, indicating that an impairment of the functional status can be associated to a decrease in the QoL. However, even in this subgroup, the correlation was at best only moderate ( $\leq 0.380$ ). The perceived impact of LBP on the quality of life as measured on an 11-point NRS was significantly correlated with the two LBP-specific questionnaires. However, the correlations coefficients were low (ranging from 0.23 to 0.28) and concerned only the IsoLBP and LBP + OP subgroups. These results parallel those evidenced by means of the KIDSCREEN, with a majority of dimensions of the generic questionnaire presenting no robust correlations with the two LBP questionnaires either [19].

The adjusted  $R^2$  of the multivariate regression model was 0.28 for the KIDSCREEN and 0.19 for the NRS (Table 4). Contrary to the results of the KIDSCREEN, age and gender were not related to QoL as measured by a

**Fig. 1** Mean (95% confidence interval) values of KIDSCREEN 10, and the numerical rating scales assessing quality of life and the impact of low back pain on quality of life, according to groups defined by reported pain





**Table 3** Prevalence of self-reported health problems and life events perceived as affecting quality of life

	Pain-free ( <i>N</i> =481)	OPain ( <i>N</i> =365)	IsoLBP ( <i>N</i> =242)	LBP + OP ( <i>N</i> =268)	LBP + WBP ( <i>N</i> =50)
Health problems*	11.6%	22.8%	10.4%	29.9%	36%
Life events*	11.8%	18.4%	11.6%	17.7%	32%

Chi-squared test of differences between subgroups

\* $p < 0.001$ , \*\* $p < 0.003$

NRS. The results pointed to the subjective impact of LBP as highly and inversely related to the adolescents' appraisal of their QoL whether measured with an 11-point NRS or with the KIDSCREEN-10 index. The same was true for the mention of life events with a perceived impact on the quality of life (with a regression coefficient higher for the NRS than for the KIDSCREEN-10, i.e. 1.2 vs. 0.5, respectively). The mention of health problems

other than LBP was significantly related to the adolescents' appraisal of their QoL in the regression model of the KIDSCREEN, but not of the NRS. Taken together, these results suggest that the NRS does effectively assess QoL as global rather than as related to health or pain problems. In the same way, the presence of whole-body pain associated to LBP was significantly related to the KIDSCREEN but not to the NRS regression model.

**Table 4** Association of quality of life, assessed by numerical rating scale (NRS) and KIDSCREEN 10, with socio-demographic variables, pain subgroups, health problems, and other life events, estimated by Multivariate Regression Linear Models

	NRS QoL		KIDSCREEN 10	
	<i>B</i> (SE)	<i>p</i> value	<i>B</i> (SE)	<i>p</i> value
Constant	6.4 (0.6)	0.000	4.7 (0.3)	0.000
Gender				
Female	–	–	–	–
Male	0.3 (0.2)	0.095	0.2 (0.1)	0.021
Age				
12–13 years	–	–	–	–
14 years	–0.3 (0.3)	0.297	–0.3 (0.1)	0.005
15–16 years	–0.2 (0.2)	0.398	–0.5 (0.1)	0.000
Pain subgroups				
Iso LBP	–	–	–	–
LBP + OP	0.5 (0.2)	0.008	0.1 (0.1)	0.262
LBP + WBP	–0.4 (0.3)	0.198	–0.4 (0.1)	0.005
NRS impact of LBP	–0.1 (0.0)	0.000	–0.1 (0.0)	0.000
Health problems				
No (ref)	–	–	–	–
Yes	–0.4 (0.2)	0.072	–0.2 (0.1)	0.024
Life events				
No (ref)	–	–	–	–
Yes	–1.2 (0.2)	0.000	–0.5 (0.1)	0.000
FAS				
Low 0–2	–	–	–	–
Medium 4–5	0.4 (0.3)	0.193	0.4 (0.1)	0.002
High 6–7	0.6 (0.3)	0.030	0.5 (0.1)	0.000
Max. parents education				
No studies	–	–	–	–
Primary	0.9 (0.6)	0.180	1.0 (0.3)	0.001
Secondary	1.4 (0.6)	0.015	1.1 (0.3)	0.000
University	1.5 (0.6)	0.011	1.0 (0.3)	0.000
<i>R</i> <sup>2</sup>	0.191		0.281	

NRS QoL: 11-point numerical rating scale evaluating quality of life in general

NRS impact of LBP: 11-point numerical rating scale evaluating the impact of LBP

Health problems: (other than LBP) affecting QoL

Other problems: (than health-related) affecting QoL

FAS (family affluence scale): high, medium, and low. In Barcelona, the schools were stratified according to the families' economic capacity index (high, medium, and low, in terciles). [1,28]

## Discussion

Our results show that a subset of our subjects, i.e., those reporting whole-body pain, reported a significant reduction of their quality of life. This specific group of teenagers also reported more frequently health problems other than LBP and negative life events unrelated to health.

These findings parallel to those obtained with a multidimensional instrument showing that the overall effect of LBP on schoolchildren health-related QoL is low, except for the small whole-body pain subgroup [19]. In that specific group of adolescents, all scores of the tool investigating QoL (KIDSCREEN-52) were significantly lower compared with those of their peers in the other groups. The global score obtained by means of a Numerical Rating Scale investigating QoL provided similar information, supplemented by the adolescents' appraisal of whether LBP affects their QoL: the NRS investigating their perception of the overall effect of LBP on their QoL showed that the impact of LBP was rated as marginal—unless the respondents considered themselves to have whole-body pain. Not surprisingly, these respondents also described a higher number of other health problems. Their lower appraisal of their QoL was further supported by a higher frequency of negative life events in general. Whereas these adolescents clearly deserve more attention, in the vast majority of adolescents, LBP seems to be more of a common life experience than of a disease, with little impact on their everyday life and worries.

These results parallel those of recent studies indicating that adolescents reporting pain in several musculoskeletal areas have a worse outcome in terms of chronicity of symptoms [13], but that self-reported chronic conditions are not associated with health-related QoL [17], with pain having a limited impact on function in schoolchildren from the general population, as compared to clinical samples [7]. Regardless of pain frequency, health-related QoL scores are lower for children experiencing pain in multiple body sites than in those suffering single-site pain [20]. A recent study on a birth cohort of more than 5,000 adolescents (aged 16 years) has shown that multiple pain locations are associated with a reduced QoL but not with increased care seeking, while reporting other health problems (e.g., heart disease, hypertension, asthma, allergies, dermatitis, etc.) significantly increases the likelihood of care seeking for musculoskeletal pain [15].

Our study has strengths in particular, the large number of subjects and the focus on adolescents' self-evaluation of pain but also of their own perception of other health-related issues and life events as having an impact on their quality of life. Furthermore, the comparability between two different European countries increases the generalizability of our findings, and the exploratory evaluation of global

QoL estimates' feasibility. Indeed, the study design explains the differences in age found between the two samples (Barcelona, Spain, and Fribourg, Switzerland); and the absence of relevant differences in the other variables assessed between these samples, which represent two different settings, a large industrialized, southern city and a small northern country town, supports the general applicability of our findings, at least for Western and European countries.

One of the weaknesses of our study is the cross-sectional design that does not allow inferring any causal relationship between the associated variables. Self-reported health problems cannot be considered accurate enough to be translated into actual pathologies or diagnoses. However, our results are in agreement with previous results. Among the most frequent chronic physical illnesses during puberty, a recent review mentioned specifically asthma, along with constipation, diabetes, and autoimmune conditions [18]. A large British survey reported findings stratified by age groups. In the 16–24 years age group ( $N=1151$  subjects), 84.4% of subjects were free of any of the eleven most prevalent illness categories, including back pain, the subgroup reporting back problems, plus one or more other physical problems had a higher risk of psychiatric problems [2].

Our global questions did not undergo an actual validation procedure. According to a recent study in a group of adolescents (mean age= $13.2\pm 2.5$  years) suffering from inflammatory bowel disease, Likert scales were preferred to visual analogue scales but the difficulties of appropriate phrasing were highlighted by the authors [14]. However, a global perception of the general health by means of a VAS was reported to correlate with a multidimensional questionnaire in a study including more than 3,000 adolescents [25].

The problem of item reduction is a highly complex one and different approaches have been used to this reduction which forces the researcher to decide whether patients' view or statistical aspects are most important [10,16]. Global scores provided by NRS have been used to evaluate parental estimation of their children's health-related QoL [6]. The parents' mean score was comparable to the children's self-reported QoL as assessed by the Pediatric Quality of Life Inventory. Although obtained in a different context, these results lend support to the relevance of a global appraisal of QoL. The need for short questionnaires in the evaluation of back pain patients has been highlighted by the authors of a minimum outcome core set. In these studies, single item scales showed a good reliability [5,11].

## Conclusions

LBP affected QoL marginally. Only adolescents complaining LBP + WBP reported significant QoL impairments,

more co-morbidities, and life events affecting QoL. These results further stress the distinction between disease and common life experience. Clinicians can probably adopt a reasonably reassuring attitude with initially limited investigations and/or prescription of symptomatic treatments for teenagers reporting isolated LBP. The findings of our study suggest that global evaluations of the impact of LBP and/or QoL by means of NRS would be feasible and meaningful, but this study does not allow concluding on the use of a NRS as a global measure of QoL in adolescents. However, the results indicate that global assessments deserve further developments regarding their potential value in clinical settings and their role in providing an estimation of QoL and how LBP may affect it in adolescents before reviewing these issues in detail when appropriate. Clinicians would benefit from tools brief enough to reduce the respondents' burden, and practical for routine clinical use to estimate quality of life and the impact of LBP in adolescents before reviewing it in detail when appropriate. Longitudinal studies are required to further assess the clinical relevance and to evaluate the psychometric properties of global NRS in the evaluations of QoL in children and adolescents.

**Conflicts of interest** None.

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